Anthropology and Environmental policy: What Counts?

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ABSTRACT In this article, we call for enhanced quantitative and environmental analysis in the work of environmental anthropologists who wish to influence policy. Using a database of 77 leading monographs published between 1967 and 2006, 147 articles by the same authors, and a separate sample of 137 articles from the journal *Human organization,* we document a sharp decline over the last ten years in the collection and use of quantitative and environmental data within environmental anthropology. These declines come at the same time that environmental anthropologists are aiming at greater policy relevance. We use the case of the Polonoroeste Project in the Brazilian Amazon and its impact on World Bank policy as a concrete example of the advantages of fortifying the quantitative and environmental side of our work. We conclude by discussing ways to strengthen environmental anthropology to further enhance its policy relevance and impact.

Keywords: environmental anthropology, environmental policy, quantitative methods, Amazonia, Polonoroeste

The subfield of environmental anthropology exhibits a growing engagement with both domestic and international environmental policy. This engagement is evident in works like Patricia Townsend's 2000 book entitled *Environmemal Anthropology: From Pigs to Policies* and the summer 2007 issue of *Human Organization* with its special section on "Anthropology and Environmental Policy." There are good reasons for anthropologists to be concerned with environmental policy: it not only affects the land and resources that people depend on for their livelihoods out also has major implications for social justice and human health.

We applaud this growing focus on policy among fellow environmental anthropologists. At the same time, we notice a second trend in the subfield: a decline in recent years in the use of quantitative and environmental data. This second trend, if true, is worrisome to us for several reasons. First, the environmental policy arena is often dominated by biophysical scientists and economists. Consequently, the dominant scientific discourse is quantitative, and anthropologists must engage with that discourse if we wish to be heard. Second, quantitative data allow for more robust hypothesis testing, for measurement of impacts and trends, and for assessing the scale and rate at which impacts occur. They also allow for more convincing comparative analysis than do qualitative data alone. Third, policy makers often do not have time to read lengthy works containing qualitative data. Instead, in our experience, they typically gravitate toward quantitative charts and tables that quickly communicate information. Fourth, recent history has pointedly demonstrated that subtle, long-term changes in the environment can have large repercussions for human welfare. Quantitative data make possible the documentation and monitoring of such trends, allowing for corrective or mitigating policy. Fifth, because environmental data are typically quantitative, social data can most easily be integrated with them when they are also quantitative, making it easier to link social and environmental phenomena. Finally, it will be difficult to influence environmental policy until we can demonstrate how environmental change affects peoples' lives and how peoples' actions affect the environment. Doing so requires "bringing the environment back in" via environmental data.

For these reasons, we believe that quantitative and environmental data should be presented and discussed in works of environmental anthropology that aspire to influence policy. These data may already exist from earlier studies, they may be gathered and analyzed by anthropologists themselves, or they may be obtained by collaborating with scholars in other disciplines who provide them or help with analysis.

Our argument is not that quantitative and environmental data alone are important for influencing policy but, rather, that they are important ingredients of policy-oriented research and its presentation. We fully recognize the value of qualitative and social data and view them as foundational to what we, as anthropologists, contribute in the environmental arena. Indeed, each of us has worked hard to convince policy makers of the validity and worth of qualitative data in our own studies. But each of us, working in quite different arenas, has had multiple policy makers insist on quantitative

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data, sparking our concern with trends in the subfield. Qualitative methods are important, but for policy purposes they can be strengthened with quantitative methods and analysis.

In short, our argument is that two things are needed to improve environmental anthropology's influence on policy: (1) it must be strong in both qualitative and quantitative data and (2) it must build on a solid foundation of both social and environmental data. Our focus in this article is on quantitative and environmental data because of our concern that they are being de-emphasized in the subfield, even as it has become increasingly concerned with environmental policy.

The first part of this article tests three hypotheses: (1) over the past four decades, environmental anthropology has become increasingly concerned with environmental policy; (2) at the same time, the published literature shows a decline in the presentation of both quantitative and environmental data; and (3) this trend is not the result of increasing collaboration with scholars from other disciplines who publish quantitative and environmental data elsewhere. The second part of the article presents a case study of the ways that quantitative and environmental data, in combination with careful ethnographic analysis, have proven highly effective in influencing environmental policy.

PART I: ANALYSIS OF THE LITERATURE

To test these hypotheses, we carried out a two-part analysis of the literature in environmental anthropology. First, we analyzed leading monographs published over the 40-year period between 1967-when Roy Rappaport's classic, *Pigs for the Ancestors,* was published-and 2006. We chose monographs not because policy makers commonly read them (on the contrary, they are more likely to read short articles) but because we wanted to assess trends in the subfield and they are one important measure. Second, we conducted similar analyses of two sets of published articles in environmental anthropology: one from the same authors as the monographs and a second from a diverse group of applied anthropologists.

Monograph Methods

We assembled a sample of monographs from this 40-year interval that met the following criteria. A monograph was included if:

1. human-environment relations were its central focus (which we took to be the defining property of environmental anthropology);
2. it contained an in-depth analysis of one, or a small number, of case studies;
3. at least one anthropologist was among its authors;
4. it had at least ten citations in Google Scholar at the time of compilation (October 2007) if published between 1967 and 2001, or at least five if published between 2002 and 2006;
5. the author (s) also published at least one journal in environmental anthropology between 1967 2006.

We circulated a draft list of selected titles among environmental anthropologists (acknowledged below), ing for additions or deletions given these criteria; consulted overviews of the field (e.g., Dove and Carpenter 2008; Haenn and Wilk 2006; Townsend 2000); followed bibliographic discussions on the AAA's Anthropology and the Environment section "Eanth- L listsery"; and adjusted the final list accordingly. The final sample included 77 titles respresenting 75 authors (see Appendix A). This sample may be biased toward environmental anthropologists working in academia, where tenure standards typically require monograph publication. Nevertheless, academia is where environmental anthropologists are commonly trained, and monographs are a major scholarly product of the subfield.

For statistical analysis we divided first editions of the books into five-year cohorts. The number in each cohort ranged from four (in the 1982-86 cohort) to 20 (in the 2002-06 cohort). We then counted the tables and figures in each monograph as an indicator of the amount of quantitative and environmental data presented in the text. We further divided these data elements into two groups: predominantly qualitative (involving categorical or descriptive data) or quantitative (involving numeric data or statistics). We also classified tables and figures as containing predominantly environmental or social data. We defined *environmental data* as data about the biophysical environment, including how people partition, order, and organize it culturally. We defined *social data* as data about people, their behavior, and properties of the social and cultural worlds not directly focused on the biophysical environment. We counted maps and photos used to display specific social or environmental information as figures. Maps and photos that simply showed a location or image were not included in the figure count. A research assistant and one of us (Charnley) independently tallied the data elements for each monograph and compared results to verify the tallies. We then divided the number of tables and figures (in various combinations of social and environmental, qualitative and quantitative) by the number of text pages in the monograph and multiplied by 100 to obtain estimates of data density in each category-that is, the number of tables plus figures per 100 pages of text. We calculated map density using the same procedure. We treated maps and qualitative data elements as possible "control variables" because we had no reason to suspect their decline over time. We averaged the resulting data-density measures for each cohort and plotted them with the standard error for each mean. Using SPSS, another assistant carried out analysis of variance (ANOVA) tests on the cohort means and an associated multiple comparisons test, namely Tamhane's T2 statistic.

As an additional test of hypothesis 2, one of us (Charnley) analyzed the methods used in monographs from cohorts 5

through 8. Monographs that did not use quantitative methods were scored as "0"; those using quantitative methods with descriptive statistics were coded "1" (whatever the data source); and those using quantitative methods with more sophisticated statistical analysis (e. g., associational, inferential, or multivariate statistics) were coded "2." For environmental data, we gave monographs a "0" if none were gathered; a "1" if secondary environmental data were gathered; and a "2" if primary (self-collected) environmental data were used in the study. We then calculated the average score and error bars for each cohort.

To identify trends in policy focus of the monographs, an assistant and one of us (Charnley) assessed the stated policy focus of each book according to its introductory chapter, preface, table of contents, and book jacket. Books making no reference to policy were coded "0"; those making partial or incidental reference to policy were coded "1"; and those having policy as a central focus were coded "2." We then calculated means plus error bars for each cohort.

Article Methods

We undertook parallel analyses of two different samples of published articles in environmental anthropology. The first sample consisted of articles written by the same authors as our monograph sample. We undertook this analysis for three reasons: (1) to test whether monograph trends were repeated in a broad range of journals in which environmental anthropologists publish (a sample of all appropriate authors and journals was impractical); (2) to test whether any decline in data in monographs was caused by authors shifting their data over to article publications; and (3) to guard against the possibility that data trends in monographs were influenced by changes in publisher policy. For each monograph author, we searched online databases for two articles having a primary focus on human-environment relations that drew on at least one empirical case. We chose one prepublication and one postpublication article closest to the monograph publication date. When unable to find two articles meeting these temporal criteria, we used two published before, or two after, the monograph. If this failed, we used one article (there were 13 authors in this category). Five authors contributed two monographs, so we analyzed four articles for each. Multiauthored articles were included whether or not the monograph author was first author. This procedure generated a sample of 147 articles.

The second sample consisted of every environmental anthropology article having at least one anthropologist as author published between 1987 and 2006 in *Human Organization* (hereafter, *HO),* the flagship journal of the Society for Applied Anthropology. We performed this analysis (1) to test whether environmental anthropologists put more quantitative and environmental data in documents they write for an applied audience and (2) to sample the work of a broader range of environmental anthropologists who had not necessarily published monographs. Although much of the policy-oriented research resides in the unpublished "gray" literature, it was impractical for us to gather this literature and so we used articles from HO instead. We focused on cohorts 5 through 8 to examine recent trends in the subfield, generating a final sample of 137 articles. Only 14 of the 181 HO authors (7.7 percent) were also monograph authors, making this a largely independent sample.

The articles were analyzed much like the monographs. Two assistants counted the number of maps, tables, and figures, distinguishing between those that were predominantly qualitative and quantitative and those having social and environmental data. The results were checked bv one of us (Charnley) and then analyzed by date of publication, using the same five-year cohorts as the monograph analysis and the same statistics. In a second phase of analvsis, we followed Michael Chibnik (1999) in tallying the proportion of articles in each cohort that had at least one quantitative table or figure as well as at least one environmental table or figure. We then plotted the proportion of articles having nonzero values for these two variables by cohort. We assessed the policy focus of articles published by the monograph authors but assumed that articles published in *HO* had some degree of policy focus and did not evaluate **it.**

If the use of quantitative and environmental data has declined, one possible explanation is collaboration. As methods for quantitative and biophysical research have become more sophisticated, it is possible that environmental anthropologists have increased collaboration with scholars from other disciplines who provide these data. Anthropologists may thus simply reference findings published elsewhere by their collaborators instead of putting these data into tables and figures in their own publications. Doing so would lead us to overlook the use of quantitative and environmental data by anthropologists because we chose figure and table density as a key indicator.

We tested this hypothesis using both article samples and cohorts 5-8. We assumed that environmental anthropologists who are collaborating with other scientists acknowledge them in publications either by listing them as coauthors or by listing them in aclmowledgments. We thus counted the number of authors on each article and identified their discipline using information in the publication or locating them via Google. We also note whether or not collaborators were acknowledged in each article (not including research assistants or solicited reviewers).

Monograph Results

Figure 1 shows the average policy focus by cohort of environmental anthropology monographs from 1967 to 2006. From 1967 to the mid-1980s, environmental anthropology monographs exhibited little policy focus on average. The next two cohorts showed a sharp increase, rising to a high average policy focus through 2002-06. Analysis of variance confirms that the means are Significantly different across the cohorts ($F = 4.43$, $P < .001$). Tamhane's T2 test showed no

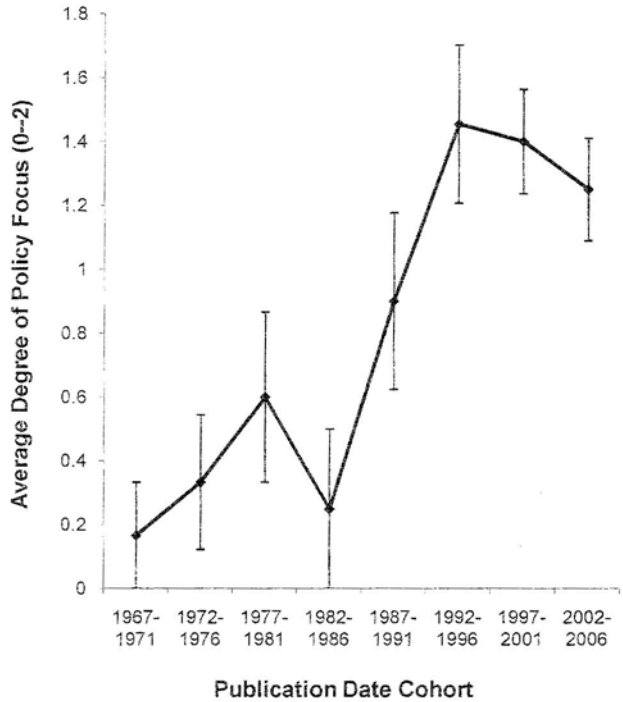

FIGURE 1. *Policy focus of environmental anthropology monographs, 1967–2006.*

significant difference between the high averages for cohorts 6, 7, and 8 ($p > .05$).

Figure 2 displays the use of quantitative data in the same monographs between 1967 and 2006. The figure shows a period of buildup in average quantitative data density from 1967 to 1981. After 1981, the average settled to roughly ten data tables and figures per 100 pages through the mid-1990s. Since 1996, however, the average amount of quantitative data in the monographs has declined. Indeed, the 2002-06 period shows the lowest use of quantitative data (3.1 tables and figures per 100 pages) in the past 40 years. ANOVA confirms that the cohort means are different ($F = 4.11$, $P < .001$), and Tamhane' s T2 revealed that the difference in use of quantitative data between cohorts 6 and 8 is significant ($p < .05$).

Figure 3, on environmental data, shows a gradual, if ragged, increase between 1967 and the mid-1990s. Since the mid-1990s, there has been a steep drop in environmental data in the monographs. Although the ANOVA test found that the differences in means across cohorts were not significant at the .05 level owing to their high variances ($F = 1.64$), Tamhane's T2 test confirmed a significant drop in environmental data density-from 8.3 to 3.1 data elements per 100 pages-between cohorts 6 and 8 ($p < .05$).

Taken together, these findings suggest that quantitative and environmental data have been increasingly left behind in environmental anthropology, while the field's policy focus has been growing. In contrast, the ANOVA and Tamhanes T2 tests performed across cohorts for qualitative data density and map density, both control variables, produced no significant differences in cohort means ($F = .79$ for qualitative data; $F = .70$ for maps; $p > .05$). The 77 monographs in our sample represented 40 different publishers. Therefore, we were doubtful that the trends in quantitative and environmental data were simply the result of changes in publishers'

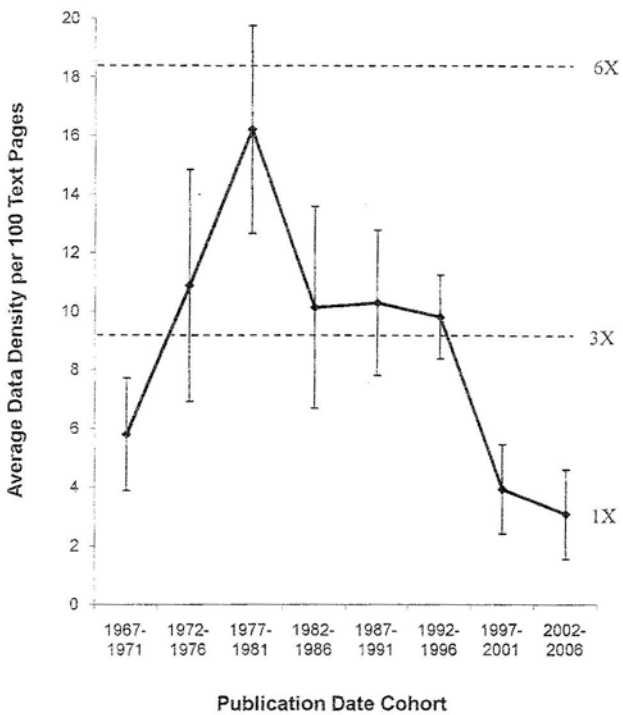

FIGURE 2. *Quantitative data density in environmental anthropology monographs, 1967–2006. Dashed horizontal lines show, for comparison, three times (3×) and six times (6×) the average quantitative data density of the 2002–06 cohort (1×).*

FIGURE 3. *Environmental data density in environmental anthropology monographs, 1967–2006.*

policies (e.g., favoring fewer tables and figures in recent years to cut costs). These suspicions were confirmed by the analysis of methods in the last four cohorts of monographs. Figure 4 shows that the use of quantitative methods sharply declined in the last two cohorts, and Figure 5 shows a parallel drop in the collection of environmental data. ANOVA tests showed that the differences across cohorts in both plots were Significant ($F = 8.05$ and 7.08 respectively, $p < .001$).

Article Results: Monograph Authors

Our sample of 147 environmental anthropology articles from monograph authors came from 69 different journals and generally fell into the same cohort as their monograph (s) or into one immediately adjacent. Like the monographs, journal articles showed a significant increase in policy focus over time (see Figure 6; $F = 5.14$, $P < .001$).

As shown in Figure 7, average quantitative and environmental data density in articles produced trends across cohorts that were roughly consistent with the monograph trends. There is an anomalous drop in data density in cohort 4 (1982-86), for which we have no good explanation. The big decline at the end occurs later than for monographs, between cohorts 7 and 8. This difference is not unexpected, given that monograph authors from cohort 6 often published articles in cohort 7. Cohort 8 had about half the data density as cohort 7 in both cases. But ANOYA tests found no significant difference among the means because of high variation within all cohorts-variation that we attribute to the brevity and diversity of articles in the sample ($F = .78$ and .93, quantitative and environmental, respectively; $p > .05$). ANOVA also found no Significant differences in the cohort means for the two control variables, maps and qualitative data ($F = .80$ and 1.24 for maps and qualitative data, respectively; $p > .05$).

Figure 8 shows the results we obtained using Chibnik's (1999) methods. About half of the articles (50 to 58.3 percent) published between 1967 and 1996 contained quantitative data, with the exception of cohort 4, which was again anomalous. A decline in quantitative data began in cohort 7 and continued in cohort 8, in which about one-third of the

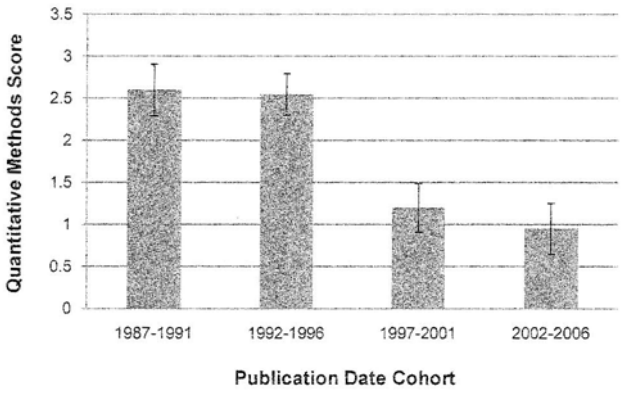

FIGURE 4. *The use of quantitative methods in environmental anthropology monographs, 1967–2006.*

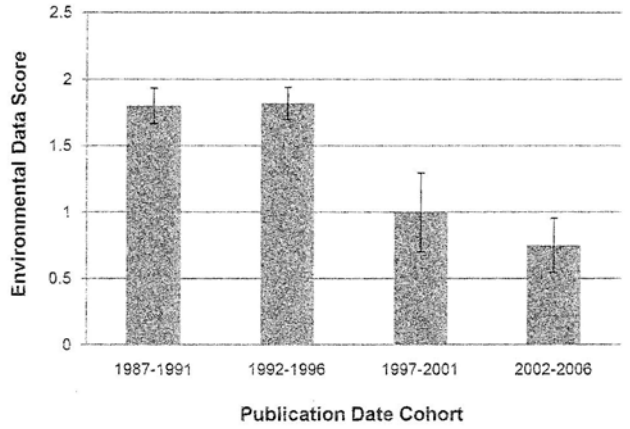

FIGURE 5. *The collection of environmental data in environmental anthropology monographs, 1967–2006.*

articles had quantitative data. A similar pattern occurred for environmental data. Setting aside anomalous cohort 4, there was an increase in the proportion of articles containing environmental data between 1967 and 1991. The proportion remained relatively high through 1996. Cohorts 7 and 8 showed a decline in the use of environmental data, dropping from 65 percent of the articles in cohort 6 to 43.3 percent in cohort 8. These findings are consistent with the trends found for the monographs.

Article Results: Human Organization

Our analysis of environmental anthropology articles published in *Human Organization* between 1987 and 2006

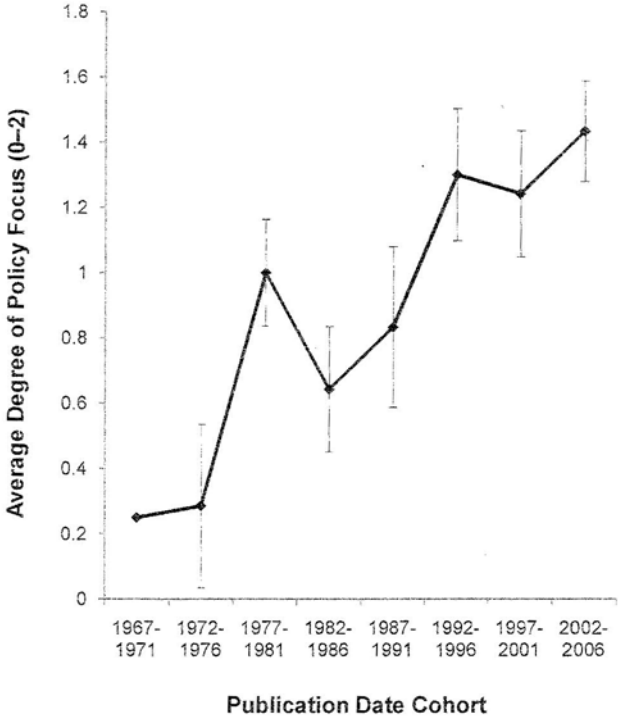

FIGURE 6. *Policy focus of environmental anthropology journal articles, monograph author sample, 1967–2006.*

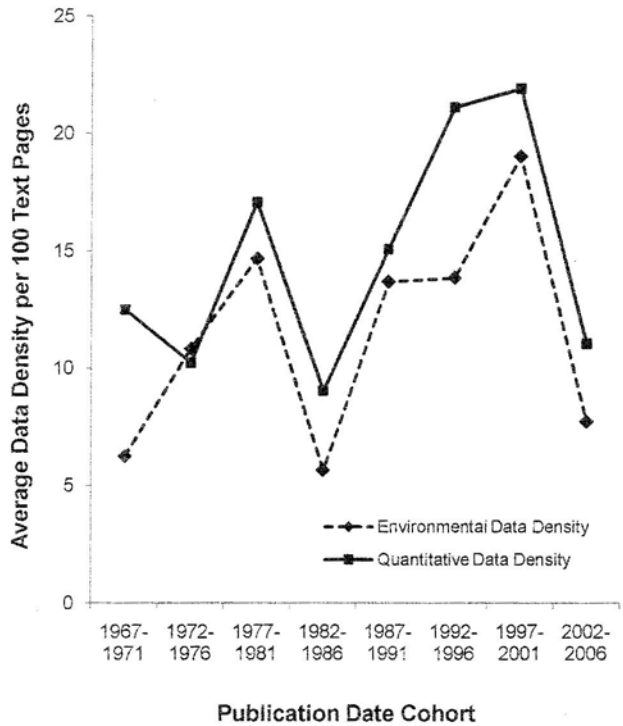

FIGURE 7. *Quantitative and environmental data density in articles by monograph authors, 1967–2006.*

produced trends consistent with the results above for quantitative data but not for environmental data (see Figure 9). The ANOVA test showed the cohort means for quantitative data to be Significantlydifferent ($F = 6.70$, $P < .001$), and Tamhanes T2 test found a Significantdifference in the use

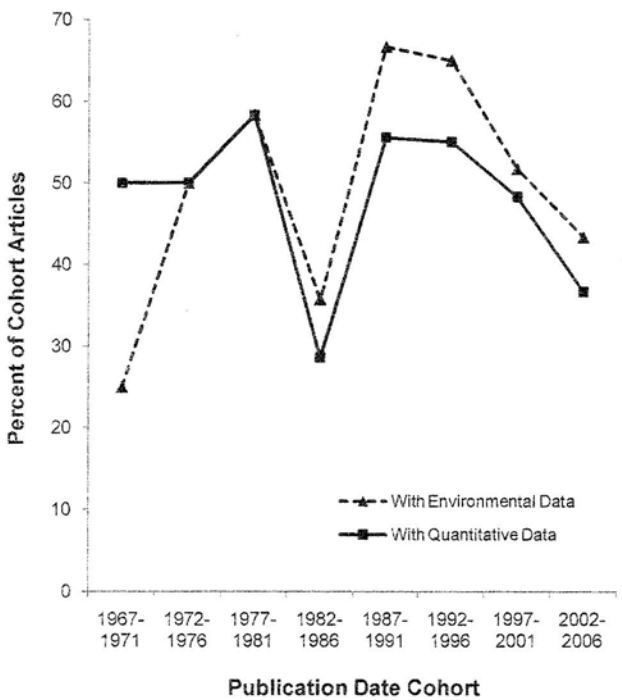

FIGURE 8. *Percentage of environmental anthropology journal articles by monograph authors containing quantitative and environmental data, 1967–2006.*

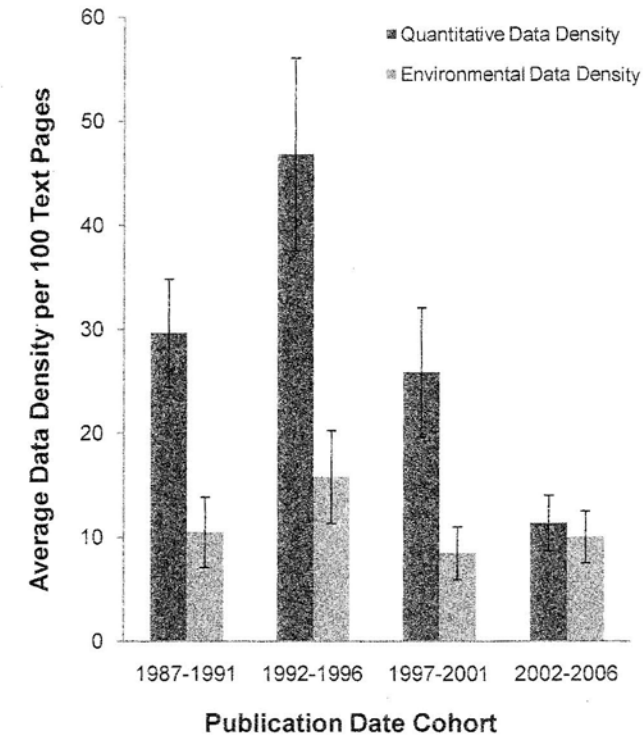

FIGURE 9. *Quantitative and environmental data density in* Human Organization *articles, 1987–2006.*

of quantitative data between cohorts 5 and 8 as well as 6 and 8 ($p < .05$). Neither test showed a significant difference in the cohort means for environmental data, however ($F = .92$, $P > .05$). We did find a significant difference among the means for qualitative environmental data ($F = 2.71$, $P < .05$), which generally increased over the interval, but that was offset by a downward trend in the means for quantitative environmental data that failed to reach Significance ($F = 2.62$, $P > .05$; see Figure 10). We attribute the increase in qualitative environmental data to a greater use of maps and satellite imagery. Neither test found a Significant difference in cohort means for the two control variables, maps and qualitative data ($F = .94$ for maps; $F = 1.00$ for qualitative data; $p > .05$).

Figure 11 shows the results of the *Human Organization* analysis using Chibniks methods. There was a steady decline in the percentage of articles containing quantitative data between 1987 and 2006: from 77.8 percent in cohort 5 to 39.1 percent in cohort 8. In contrast, a slight increase occurred in the proportion of articles containing environmental data in cohorts 7 and 8 as compared to cohorts 5 and 6.

Collaboration Results

Regarding collaboration, the average number of authors per article ranged from 1.8 to 2.6 for the cohorts of monograph authors and from 1.4 to 1.8 for the cohorts of *HO* authors. There were no significant differences in cohort means for

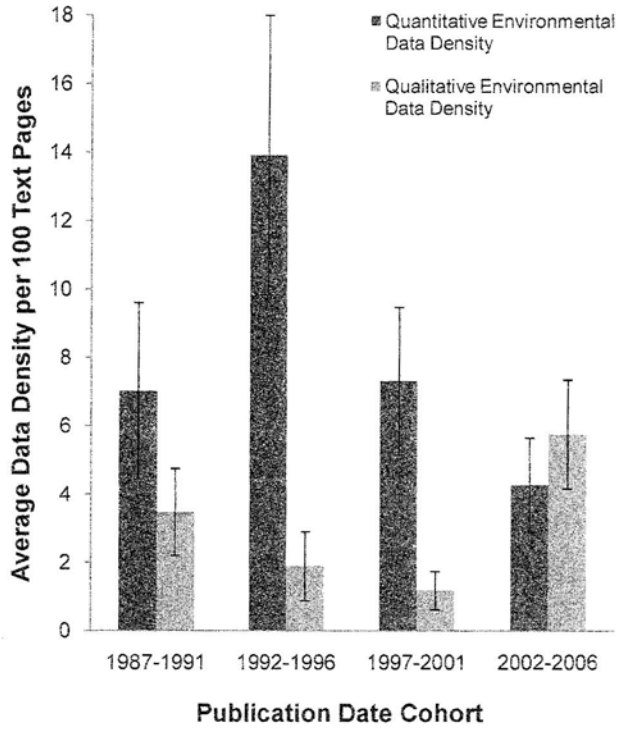

FIGURE 10. *Quantitative and qualitative environmental data density in* Human Organization *articles, 1987–2006.*

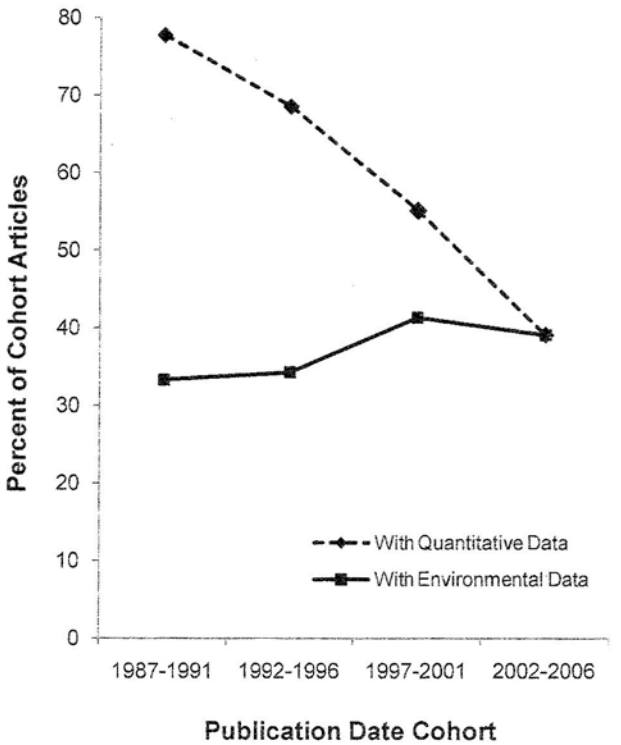

FIGURE 11. *Percentage of* Human Organization *articles containing quantitative and environmental data, 1987–2006.*

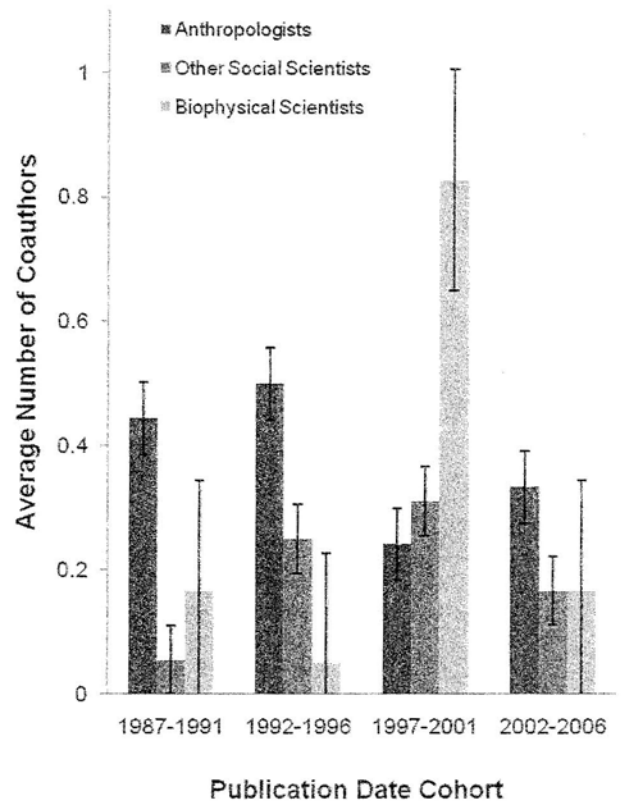

FIGURE 12. *Average number of coauthors per journal article by discipline, monograph author sample, 1987–2006.*

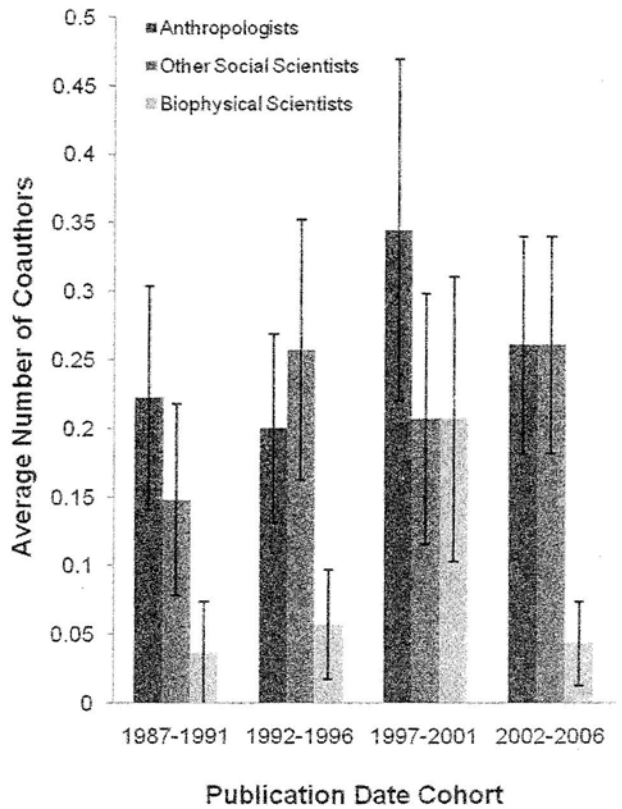

FIGURE 13. *Average number of coauthors per journal article by discipline,* Human Organization *sample, 1987–2006.*

either sample ($F = 1.29$ for monograph authors; $F = 1.04$ for *HO* authors; $p > .05$). In general, environmental anthropologists coauthor articles with other anthropologists more than with scientists from other disciplines (see Figures 12 and 13). Of the nonanthropologists, the leading coauthors in the *HO* sample are other social scientists, while in the monograph-author sample they are biophysical scientists. This latter finding is attributable to cohort 7 of the monograph-author sample, in which the percentage of articles having biophysical coauthors was more than double that of the other cohorts (38 percent) and contained two specific articles having unusually high numbers of biophysical coauthors (five each). ANOVA tests found no significant differences in the mean number of anthropologists ($F = .75$ for monograph authors; $F = .46$ for *HO* authors; $p > .05$), other social scientists ($F = 1.00$ and $F = .35$, $p > .05$), or biophysical scientists ($F = 1.96$, $p > .05$) as coauthors in the *HO* sample. However, there were significant differences in the number of biophysical scientists coauthoring with monograph authors ($F = 4.87$, $p = .003$) for reasons already noted.

Our analysis of article acknowledgments for the monograph-author sample found that 56 percent of the articles in cohort 5 acknowledged others while only 23 percent did so in cohort 8 (a decline of more than half). For *Human Orqanization,* 44 percent of the articles in cohort 5 acknowledged others and 41 percent did so in cohort 8 (another decline but a much smaller one).

Discussion

Our analysis of monographs and articles in environmental anthropology leads to the following conclusions. First, the data support our hypothesis that environmental anthropology has become increasingly concerned with policy over the past four decades. Second, data also support our hypothesis that publications in the subfield have become less inclusive of quantitative data, at least since the mid-1990s. For the monographs, quantitative data density dropped from an average of 9.8 items per 100 pages in cohort 6 (1992-96) to 3.1 items per 100 pages in cohort 8 (2002-06). In journal articles by monograph authors, quantitative data density dropped from an average of 21.1 items per 100 pages in cohort 6 to merely 11.1 items per 100 pages in cohort 8. The drop was much greater in *Human Organization* articles, falling from an average of 46.8 to 11.4 items per 100 pages of text between cohorts 6 and 8. Declines in both quantitative environmental and quantitative social data from the mid-1990s to the mid-2000s contributed to these trends in all three samples.

Third, the data largely support our hypothesis that scholarship in the subfield has also become less inclusive of environmental data. Environmental data density in the monographs went from an average of 8.3 to 3. 1 items per 100 pages between cohorts 6 and 8. Environmental data density in articles by monograph authors decreased from an average of 19.0 items per 100 pages in cohort 7 to 7.7 in cohort 8. For *Human Organization,* environmental data density fell from 15.8 to 10.0 items per 100 pages of text, on average, between cohorts 6 and 8, although this drop was not statistically significant because of a rise in qualitative environmental data between cohorts 7 and 8. This rise resulted from an increase in the use of figures but not tables. Thus, an unexpected result of the *HO* analysis is that environmental anthropologists doing applied work are increasingly using figures-including maps, GIS, aerial photos, and satellite imagery-to convey environmental information, a tendency we applaud.

Fourth, we find no evidence that environmental anthropologists increased overall collaboration with other anthropologists or with scholars from other disciplines between 1987 and 2006. One exception is collaboration with biophysical scientists in cohort 7 of the article sample from monograph authors, which dropped again in cohort 8 by more than 75 percent. Interestingly, there is a parallel trend in environmental data density in this journal-article sample (see Figure 7), suggesting that collaboration with biophysical scientists leads to higher, not lower, data density in environmental anthropology publications.

We conclude that data from monographs and articles in environmental anthropology support hypotheses 1, 2, and 3. We find similar trends of increasing policy focus and declining usage of quantitative and environmental data by environmental anthropologists, whether in monographs or in journal articles by monograph authors. We also find a parallel decline in investigators' methods as reported in their monographs. Analysis of *HO* confirmed these trends, except for qualitative environmental data. Because our sample of publishers and journals is large and diverse, cutbacks by certain publishers are not likely to explain these declines. Moreover, we find no significant change in two control variabies over the same interval for all three samples. Finally, the decline in quantitative and environmental data presentation in environmental anthropology publications is not the result of increasing collaboration with scholars from other disciplines who then publish quantitative and environmental data elsewhere.

An important implication of these findings from a policy standpoint pertains to how environmental anthropologists communicate data. As we note above, policy makers often seek charts and tables that communicate information quickly and effectively. Figure 14 indicates that the decline in total data density (all figures plus tables per 100 pages of text) in environmental anthropology is pervasive and statistically significant in two out of three samples (monographs and *HO* articles, $p < .001$) and, we believe, counter to the needs of policy makers.

To illustrate why these trends are worthy of concern, we turn now to a case study that shows how quantitative and environmental data, together with qualitative ethnographic analysis, have been highly influential in policy making in the past.

PART II: THE WORLD BANK AND POLONOROESTE

Among the examples of policies influenced by the work of anthropologists (see McCay 2000; Okongwu and Mencher 2000), one case from Amazonia is especially apt because

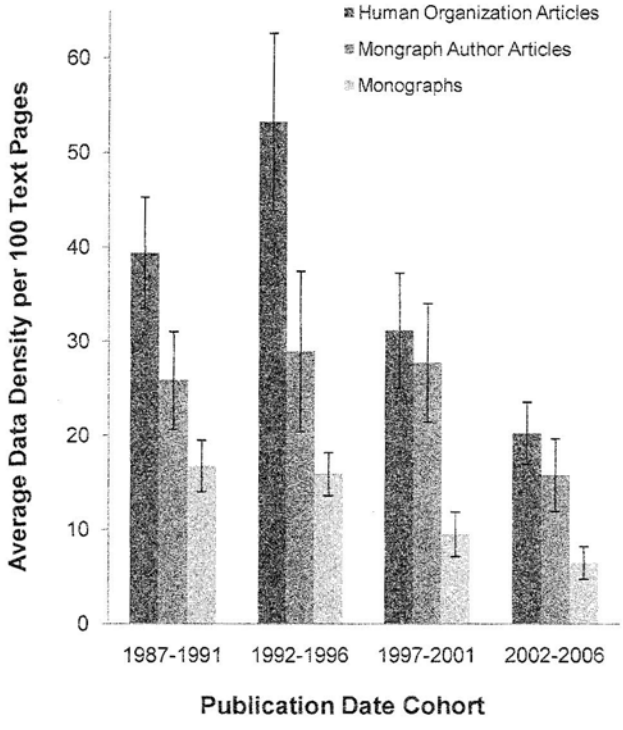

FIGURE 14. *Total data density by sample, cohorts 5 through 8.*

it triggered an overhaul of development and environment policies at the World Bank. The case concerns the 1980s agricultural development project "Polonoroeste" in Brazil and its aftermath. Here we examine the case and assess the role that qualitative, quantitative, and environmental data played in prompting major changes in World Bank policy.

Methods

Two methods were employed in this phase of research. The first was a comprehensive review of published academic literature on the Polonoroeste project (aided by bibliographies in Brown 1992, Pedlowski 1997, Redwood 1993, and Rich 1994), including contributions from both World Bank employees and its critics. The second method was an assessment of U.S. Congressional Hearings, using LexisNexis Congressional, on the "Environmental Impact of Multilateral Development Bank-Funded Projects" and related topics in the 1980s and 1990s. The hearing records are particularly germane because of their nearly verbatim discussion of evidence presented, including witness statements and academic publications. The records also reflect the reactions of subcommittee members as the information was discussed; subsequent actions of the subcommittees are also a readily accessible part of the public record.

The Case

Late in 1981, following months of background study, the World Bank granted the Government of Brazil $320 million in support of its project to build a "growth pole" in northwestern Amazonia called Polonoroeste. By 1983, the bank had increased the total loan package to $434.4 million, including substantial funds for roads and infrastructure development (57 percent) and colonization projects and resettlement schemes (23 percent) but relatively little (about three percent) for environmental protection, native peoples' protection, and public-health improvement (Pedlowski 1997). The project, the total cost of which was later estimated at $2.2 billion, was at that time one of the largest development schemes ever to receive World Bank funding. It formed part of an older campaign in Brazil to provide "Land without people for people without land" *(Terras sem Homens para Homens sem Terra;* see Alston et al. 1996:218), with the destination being the remote Amazonian state of Rondonia plus a part of neighboring Mato Grosso (for a total area almost as large as Sweden; see Figure 15). The project was one of the first in the bank's portfolio to contain an environmental-protection component: the loan agreement included funds to set up protected forest areas and ecological research stations as well as indigenous reserves (Redwood 1993).

A decade later, more than one million colonists and gold miners-an order of magnitude exceeding what planners had anticipated-had found their way to Rondonia and Mato Grosso along the freshly paved BR364, only to find hardship, poor soils, and very uneven implementation of project goals. Settling agriculturalists and miners learned the hard way that the area was not a "land without people" but, rather, a land claimed by more than 34 native Amazonian populations, many of them Tupi-speaking headhunters who actively resisted colonist invasions (Brunelli 1986; Cowell 1990a, 1990b). The colonists' efforts to be productive despite the odds wrought significant environmental change in short order. Polonoroeste soon became a major environmental debacle and one of few major environmental blunders to earn a World Bank apology. Said World Bank president Barber Conable in 1987, Polonoroeste was "a sobering example of an environmentally sound effort which went wrong. The Bank misread the human, institutional, and physical realities of the jungle and the frontier" (Cowell 1990a: 131). The first ten years of the project (1981 to 1991) came to be known as the "decade of destruction" (Cowell 1990a, 1990b), providing appropriate boundaries for our analysis here.

An organized critique of Polonoroeste grew out of the efforts of five or six environmental NGOs, coordinated in part by Steve Schwartzman, an anthropologist trained at the University of Chicago, and lawyer Bruce Rich of the Natural Resources Defense Council. Their lobbying, described in Rich 1994, focused on U.S. Congressional Subcommittees for the very good reason that congressional appropriations, forwarded through the U.S. Treasury Department, were then roughly one-fifth of the World Bank's total funds per year. At the same time, the NGOs ran a successful media campaign to educate wider audiences at home and abroad about the environmental consequences of the loans, helping to enlist the support of overseas NGOs (Aufderheide and Rich 1988; Goodno 1992). It is especially noteworthy that the work of anthropologists, including but not limited to environmental anthropologists, was crucial to the NGO

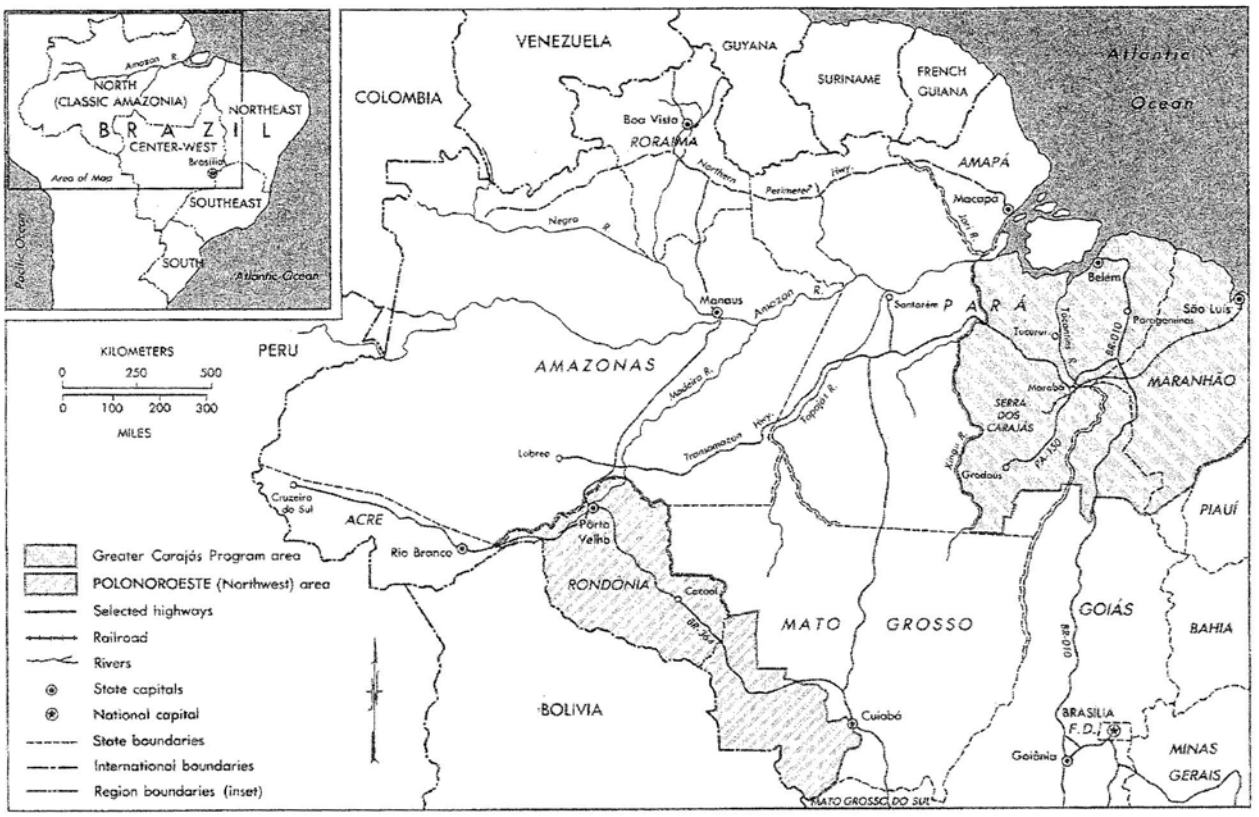

FIGURE 15. *Location in Brazil of the Polonoroeste Project (Mahar 1989:24 with permission from the World Bank). Map also shows a second growth pole with World Bank funding, Greater Carajas, beyond this article's scope.*

campaign. These efforts, in tum, prompted responses by indigenous and human rights organizations (incl. Amnesty International, Survival International, and Cultural Survival; see Maybury-Lewis 1986) and by the American Anthropological Association and the Brazilian Anthropological Association, adding further legitimacy to the snowballing protest that eventually brought about policy change. To be sure, a few internal voices at the bank argued simultaneously for more attention to the environmental and cultural impacts of loan activities (see Goodland 1986; Redwood 1993), and bank projects other than Polonoroeste were also attracting criticism (e.g., Le Prestre 1995; Schwartzman 1986a). But the record leaves little doubt that qualitative and quantitative evidence about Polonoroeste from scholars in anthropology and cognate fields played the most important role.

Qualitative Data

First, consider the role of qualitative data in the NGO campaign. Important ethnographic works about the colonization effort and its impact were written by anthropolOgists including Jason Clay (1981), Linda Greenbaum (1984), Carmen Junqueira and Betty Mindlin (1987), David Mavbury-Lewis (1981), David Price (1981, 1989), and Stephan Schwartzman (1984, 1986a, 1986b). These reports focused on the staggering impact of the project's road construction and colonization efforts on indigenous communities. Such efforts proceeded far faster than attempts to demarcate native lands, set up indigenous reserves, or provide communities with adequate vaccination and health-care services. Collectively, anthropologists showed that the efforts of FUNAI (the Brazilian government's Indian agency) were a "near-total failure" in protecting local indigenous populations against recurrent land invasions, "galloping cultural impoverishment," and rampant introduced diseases (Greenbaum 1984).

There were parallel contributions from scholars in other fields, including sociology (Branford and Glock 1985), law (Rich 1985), and geography (Brown 1992). But the most influential work early in the critique was that of Price, an anthropologist. At the subcommittee hearings in 1983, Price gave pointed testimony regarding the bank's distortion and suppression of his research on the many threats of Polonoroeste to the lives and welfare of an estimated 8,000-plus indigenous people (Price 1983). For example,

> on December 3, 1981, the World Bank announced it had agreed to fund the Polonoroeste project. A year and a half later, no rational system of reservations has yet been established and health care is still inadequate, despite the continuing efforts of the indian agents ... FUNAI opened a new regional office in the little town of Vilhena. According to a [recent] letter from an acquaintance **'who lives in the area, "rivers of *money*" are being "thrown** away on a gratuitous building program, but the employees of a clinic attached to the regional office rendered little assistance during a recent malaria epidemic. The writer asserts that they "think of nothing but their paychecks" and "don't give a damn about the Indians." [Price 1983:488-489J

Of all testimonials to the subcommittee, Price's was "the most disturbing account," according to eyewitness Rich (1994:114). It was a key reason the subcommittee chair summarized the session as "shocking" and "eye opening," leaving little doubt of the importance of ethnographic data to the total campaign. But the record shows that members of that subcommittee were left wondering that day if they had heard a biased sample of negative testimonials. They asked the Treasury Department to forward the testimonials to the World Bank and sister institutions for a response. The bank returned over 1,000 pages of response, including an attempt to discredit Price's testimonial. The subcommittee remained concerned and issued recommendations for Treasury Department's use in reviewing future loan proposals from the World Bank and other banks (Rich 1994: 121). No further action was taken, the bank took little notice, and Polonoroeste continued unabated.

Quantitative and Environmental Data

Following the 1983 hearing, Schwartzman and Rich began compiling documentation on the impacts of Polonoroeste, confirming "the direst warnings of anthropologists such as David Price" (Rich 1994: 121). They then convinced the Congressional Subcommittee on Natural Resources, Agriculture Research and Environment to hold a second hearing in 1984. This hearing focused primarily on Polonoroeste, with testimonials from Brazilian agronomist Jose Lutzenberger and geographer Brent Millikan, a field advisor to the Polonoroeste project. Noteworthy at this hearing were three important lines of quantitative and environmental analysis: two quantitative studies of demographic change and deforestation in Rondonia and one study of precipitation and nutrient cycling within the "equilibrium system" of the intact rain forest.

First, Lutzenberger told the subcommittee that "the principal social and political objective" of Polonoroeste was "to transfer [the] agricultural poor-mainly from the northeast and south of Brazil-to the Amazon," thus providing "a safety valve" for the country's inequitable land-tenure system (Lutzenberger 1984: 16). He cited work by ecologist Philip Fearnside on rapid immigration, population increase, and urbanization in Rondonia (Fearnside 1982; also Fearnside and Ferreira 1984). Fcarnsides data showed that immigration had accelerated from 28,000 settlers per year in 1980 to over 100,000 per year in the mid-1980s, with the total population growing from 540,700 in 1981 to 1,069,600 in 1991-that is, nearly doubling during the decade (see Figure 16).

Associated with this enormous wave of immigration was what Brent Millikan called "the most serious" of Rondonia's environmental problems: "rapid and indiscriminate deforestation occurring within small-farmer settlement areas" (Millikan 1984:172). Since the 1970s, Rondonia had consistently had one of the Amazon Basin's highest rates of deforestation, but the rate virtually took offin the 1980s with the paving of the road (see Figure 16). Massive deforestation

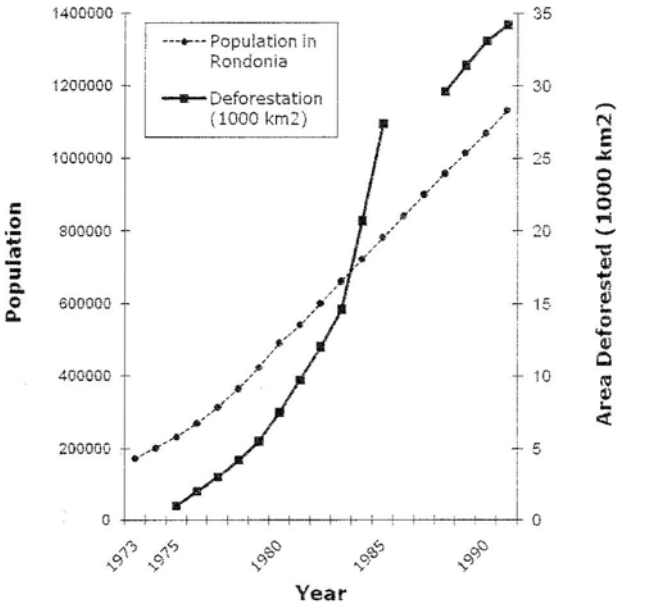

FIGURE 16. *Population and deforestation in Rondonia, 1973–1991. (Population data from Brazil's Health Ministry, http:// tabnet. datasus.gov.br/, accessed May 12, 2010. Deforestation data from Fearnside 1989 for 1975–85 and Fearnside 1993 for 1988–91.), accessed May 12, 2010*

would continue for the rest of the decade, until over 16 percent of Rondonia's forests were cleared (Fearnside 1993; Fearnside and Salati 1985), causing disruption to hydrologic cycles, soil capacity, and infectious-disease regulation. Reviewing Fearnside's analysis, Millikan told the hearing, "If deforestation continues at the current explosive (and apparently exponential) pace, the entire state of Rondonia will be deforested by the year 1990!" (Millikan 1984:172). Although later studies by Fearnside and others revised that projection downward (Fearnside 1986, 1987, 1990; Malingreau and Tucker 1988; Woodwell et al. 1986), they continued to report near-exponential trajectories. By the late 1980s, NASA called Rondonia's deforestation "the largest human-induced environmental change visible from space" (Caufield 1996: 174).

Regarding nutrient cycling, Lutzenberger cited quantitative work by Eneas Salati and Peter Vose (1984), which he included in the Congressional Record. Lutzenberger decried how the accelerating deforestation would reduce the flow of water through the local hydrologic cycle by as much as 50 percent, possibly triggering climate change but only after leaching most of the organic nutrients from already impoverished Amazon soils. Lutzenberger pushed hard on the matter of soils in the project area, noting that the initial loan terms between Brazil and the World Bank agreed

> to discourage agricultural exploitation of areas which have been determined to be unsuitable for agricultural development. . . . Why, therefore, does the Bank not object to the colonization of [9 distinct project areas] when the soil survey maps describe most of this soil as unsuitable for small farmer agriculture? [Lutzenberger 1984:25]

On such poor soils, farmers were forced into a cycle of repeated deforestation. In his testimonial at this meeting, Rich summarized:

> What is now occurring in the Polonoroeste region is an ecological, human and economic disaster of tremendous dimensions. Almost none of the environmental and Amerindian components have been implemented and the rate of deforestation ... is the highest in the Brazilian Amazon and increasing explosively. Rather than being "consolidated" as was the intention of the Bank, settlers are abandoning their cleared land and endlessly repeating the cycle of colonization and clearing. [Rich 1984:99]

Later studies would show that 70 percent of the original settlers in older colonizations had sold their plots and moved on (Brown 1992), fueling land concentration and conversion to pasture. On all of these topics-population, deforestation, abandonment, and land conversion and concentration-more sophisticated studies came later, but the quantitative studies of the early 1980s were crucial in shaping pressure on the World Bank. Shortly after Lutzenberger's and Millikan's testimonials, Subcommittee Chairman James Scheuer wrote the U.S. Secretary of the Treasury urging immediate action by the bank to curb the deforestation and threats to indigenous peoples. At about the same time, a letter from 32 NGOs in 11 countries, with the research dossier compiled by Schwartzman and Rich, was sent to then World Bank president Alden W. Clausen. When little more than a paragraph came back in reply, the suspicions of Senator Robert Kasten and his staff were confirmed "about the arrogance and lack of accountability of multilateral institutions" (Rich 1994: 122). Kasten then wrote sharply worded letters to both the World Bank president and the U.S. Secretary of the Treasury.

Policy Reform

Pressure from the hearings, from the greater NGO critique, and from increasingly concerned congressional leaders proved successful in two ways. First, a few weeks later, in March of 1985, the bank temporarily "halted remaining disbursements-totaling over a quarter of a billion dollars-on the Polonoroeste loans," pending emergency measures to protect environmental reserves and Indian lands (Rich 1984: 126). It was the first time a public financial institution had halted disbursements on a loan for environmental reasons.

Second, in 1987, new World Bank President Barber Conable not only made the apology quoted earlier but also announced sweeping environmental reforms at the bank. A full-scale Environment Department was created that grew to 200 professionals by 1993 (compared with a total environmental staff of five in 1985) to screen projects for their environmental implications and monitor their implementation (Brown 1992; Caufield 1996; Holden 1987). In addition, the bank announced plans to incorporate NGO and local-community input into the various phases of its project cycle. Lastly, the bank began funding projects specifically deSigned to combat environmental problems and laid groundwork for the creation of the Global Environment Fund (GEF) in 1989. To analysts, these reforms were seen as "important triumphs" of the NGO campaign (Brown 1992:64), but more problems lay ahead.

Further Challenges: The Epidemic of Frontier Malaria

In addition to influential quantitative studies from the early 1980s, quantitative reports later in the decade revealed explosive growth in human malaria in Polonoroeste (Kingman 1989; Marquez 1987; McGreevy et al. 1989). From the start of Polonoroeste, the government of Brazil and the World Bank provided modest funding for malaria control in the region (Redwood 1993). But those good intentions, like others in Polonoroeste, were quickly overwhelmed by one of the world's greatest epidemics of "frontier malaria" (Sawyer 1988; Singer and de Castro 2001).

Between 1973, when the area was still largely forested, and 1988, when deforestation had cleared almost one-sixth of Rondonia, the annual case rate of malaria infection from *Plasmodium falciparum* and a second, less severe form of malaria called *Plasmodium vivax* jumped from 7,000 to more than 278,000 (see Figure 17)-a 40-fold increase in 15 years (Kingman 1989; Marquez 1987). Prior to deforestation, climatic conditions were already favorable in many areas for the main Amazonian vector of malaria, the mosquito *Anopheles darlingi. H*owever, *A. darlingi* is a "forest-fringe" species that reproduces best in pools of nonacidic water that are at least partially sunlit. Such conditions are rare in mature forest except near streams or tree falls, and the indigenous communities of Rondonia had few problems with malaria historically (Coimbra 1989). All of that changed overnight with Polonoroeste.

Anthropogenic changes conspired to drastically improve conditions in the project area for *A. darlingi.* First were the annual waves of fresh "susceptibles" pouring in from malaria-free regions of Brazil. Rarely have so many unexposed susceptibles lived at such high densities in a tropical-forest environment. Second, Rondonia's roads were built in a "fishbone" grid of over 1,300 kilometers of primary roads and 10,000 kilometers of secondary and tertiary roads (see Figure 18). Colonists outside of urban centers settled along these roads, lined on both sides by open trenches. *A. darlingi* made the most of 22,600 kilometers of open, warm , partially sunlit trenches at the forest fringe. Third, the predominant land-use pattern was cyclical shifting cultivation, redoubling the forest fringe in a repetitive linear pattern. Fourth, the annual pulse of ash from agricultural burning-itself at record levels in the 1980s-reduced the acidity of standing water, producing even better breeding conditions for *A. darlingi.* Lastly, ground surveys during the 1980s found that colonist households were located an average of only 93 meters from the forest edge, well within the range of female *A. darlingi* (Singer and DeCastro 2001).

Not surprisingly, the mosquito vector did its work with record efficiency and brought unprecedented levels of malaria to Rondonia's inhabitants, as shown in Figure 17.

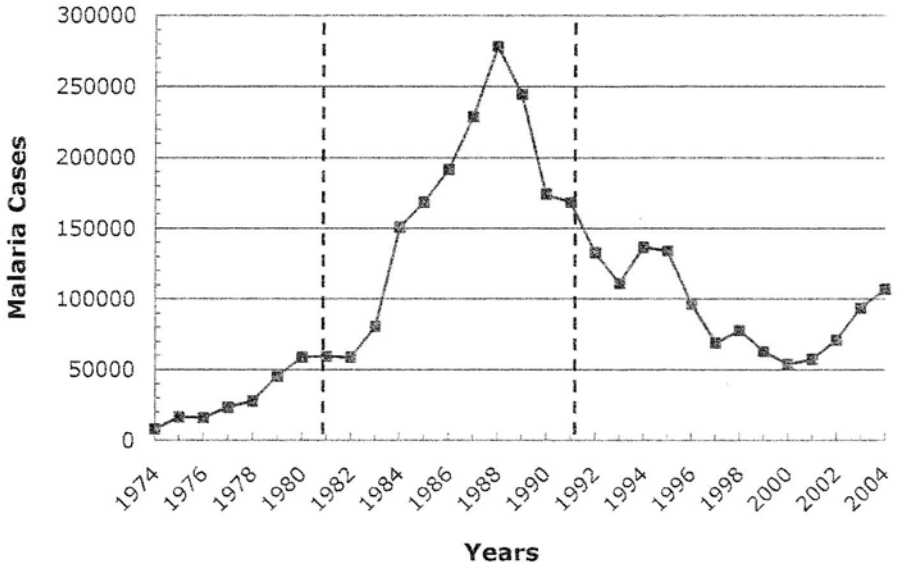

FIGURE 17. *"Frontier malaria" in Rondonia (1981–91 shown by dashed vertical lines). (See http://portal.saude.gov.br/portal/arquivos/pdf/malaria_2006.pdf, accessed May 12, 2010)*

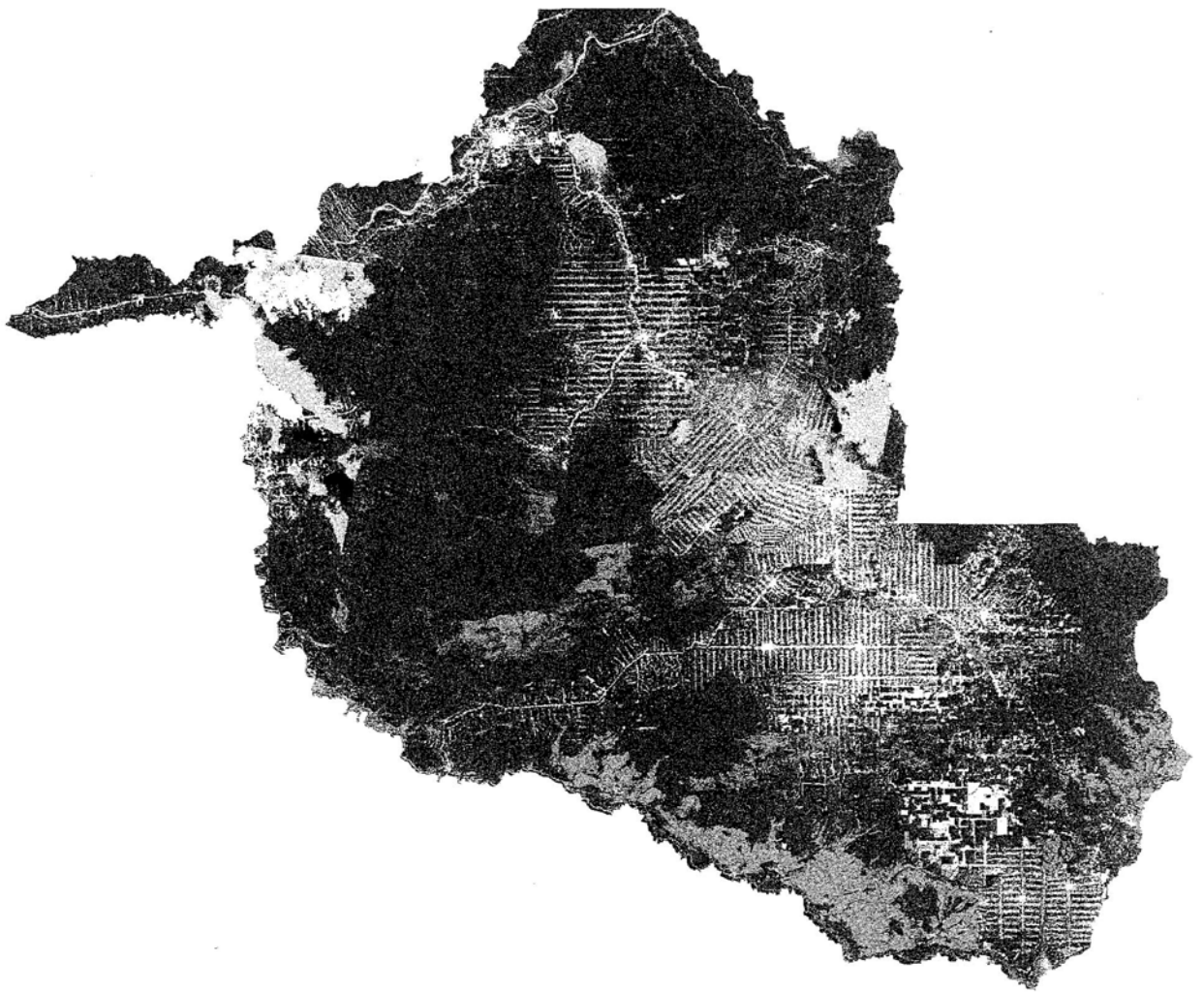

FIGURE 18. *The fishbone pattern of deforestation in Rondonia, 1992. (Source: Tropical Rain Forest Information Center, Global Observatory for Ecosystem Services, Department of Forestry, Michigan State University [with permission])*

The record wave of malaria reached peak levels in 1988, when it affected 30 percent of the state's inhabitants (not including an untold number of untested cases), most of them poor and marginalized.

For the World Bank, which had been at the time boasting of its new environmental policies, the record-setting epidemic of malaria in Rondonia in the late 1980s was quite an embarrassment. And it was one where the mounting evidentiary record was quantitative and clear, owing to the relatively careful documentation by the Ministry of Health and teams of researchers (e.g., Klein and Lima 1990; Lourenco-de-Oliveira et al. 1989; McGreevy et al. 1989). So the bank offered up a new loan in 1989-this time $99 million-for a five-year, revamped antimalaria campaign, with Rondonia as its number-one target.

The Next Phase: PLANAFLORO

By the late 1980s, there was also abundant evidence for Polonoroeste's soil and land-use problems raised by Lutzenberger in the 1984 hearings. In 1986, FAO began working with Brazil on a prescriptive land-use zoning scheme "to bring order to the chaotic and environmentally damaging land settlement process" of Polo noroeste (Mahar 2000: 116). The new plan, with the acronym PLANAFLORO (Plano Agropecuario e Florestal de Rondonia, known in English as the Rondonia Natural Resources Management Project), was based on extensive soil sampling, satellite imagery, detailed land-use maps, and a scheme for shaping human use accordingly. It divided Rondonia's surface into six agroecological zones with a legally binding range of land-use options: 29 percent for permanent conservation, including four biological preserves and eight indigenous reserves that should have been protected earlier under Polonoroeste; 28 percent for large-seale agriculture, livestock, and agroforestry; 16 percent for forest-based extractive activities, including more than 20 new extractive reserves; and only 14 percent for small-scale agriculture and agroforestry. A World Bank loan for $167 million officially started the effort in 1992. With only 14 percent of the total area deemed suitable for small-scale agriculture, the new bank loan was tantamount to admission that, in Polonoroeste, hundreds of thousands of "people without land" had indeed been lured out to a land without appropriate soil.

Lessons fromPolonoroeste and Its Aftermath

From this brief review of the Polonoroeste program and its two related "clean-up" projects, we draw the following conclusions. First, anthropologists and other social scientists played a key role in this historic example of policy change-and they did so through persuasive use of qualitative and quantitative social and environmental data. The role of testimonials at congressional hearings by Schwartzman, Price, and Maybury-Lewis, among other anthropologists, emphasizes the point that qualitative, ethnographic data were highly influential in the greater NGO campaign and change in World Bank policy. The same can be said of the testimonials of Millikan, Lutzenberger, Rich, and others; their contribution to the Congressional Record and subsequent events underscores the importance of quantitative and environmental data. Both kinds of testimonials and a mix of data were clearly important to making a convincing argument for congressional leaders, other NGOs, and indeed a broader public.

Second, different kinds of data have different strengths. The impact of qualitative data lay in their portrayal of the human experience of Polonoroeste: the harrowing tales of indigenous peoples who woke up to chain saws and bulldozers in traditional lands, who were drawn into contact and lured into market relations in a weak and disadvantaged position, who endured the disruption of forced moves and resettlement to make way for BR-364 and its waves of followers, or who watched loved ones weaken and die from malaria. Adrian Cowell's book (1990a) and film (1990b) epitomize this impact.

But the response of the first congressional subcommittee was also revealing: they suspected they were hearing a biased, one-sided account of bank activities. As Catherine Caufield summarizes, "Although taken aback by the testimony they had heard, most of the committee members did not believe that the Bank's overall impact was as harmful as its critics claimed" (1996:170) or as widespread. It was hard to get a clear sense of scale and rate from the testimonies, including Price's. How many people were adversely affected? How fast was forest being cleared, and how much had already been deforested? The strength of the quantitative and environmental data presented in the second hearing is that they readily answered such questions. They made it clear that the project affected dozens of indigenous groups, hundreds of thousands of immigrants, a forested area the size of Michigan, and explosive rates of change in key variables.

The importance of quantitative data from Rondonia was further confirmed in the two post-Polonoroeste loans issued by the bank. First, the crushing wave of malaria between 1984 and 1991, backed by impressive statistics, prompted quick action to combat it. Second, the PLANAFLORO project, which employed a large environmental database, attempted to redirect colonization and prevent encroachment on native lands.

CONCLUSIONS

In this article, we have confirmed the rise of policy focus in the environmental anthropology literature since the 1990s, a rise matched by increased discussion of how to have greater influence on environmental policy. But more has been written about the relevance of our research for shaping policy (e.g., Sillitoe 2007) than about how it has actually influenced policy and what has made it effective.

There are many ways in which anthropologists, regardless of subfield, can have a greater policy impact. One is to do a better job at playing the role of advocate and intermediary (Rylko-Bauer et al. 2006; Sanjek 2004). Another strategy is to communicate research findings more broadly and in formats that better engage the public, the media, and people in leadership positions (Sanjek 2004). A third strategy is

to conduct local research and engage in community-based, participatory research methods and long-term research partnerships that include community members and leaders, who in turn influence policy (Austin 2004; Haenn and Casagrande 2007; Lamphere 2004).

A fourth strategy, which we have focused on here, concerns the kind of research that is most influential. Many environmental anthropologists believe that ethnography is what we are especially qualified to bring to the policy arena to promote more appropriate, equitable, and effective environmental policy (Blount and Pitchon 2007; Checker 2007; Haenn and Casagrande 2007; McCay 2000; West 2005). Yet ethnography today has become almost synonymous with qualitative inquiry: "What are produced, for the most part, are verbal descriptions, explanations, and theories; quantification and statistical analysis play a subordinate role at most" (Hammersley and Atkinson 2007: 3). The dominance of qualitative ethnographic research in our subfield reflects a broader trend in anthropology over the past two decades. But as the Polonoroeste case poignantly demonstrates, qualitative data tell but part of the story. As valid and influential as they are, they are not nearly as forceful by themselves as when combined with quantitative and environmental data. Congressional leaders claimed they were shocked and concerned by qualitative ethnographic accounts of Polo noroeste, but they took effective action only after they were presented with data bearing on the scale and rate of its impact.

We are not saying that environmental anthropologists must "do it all" themselves. As the Polonoroeste case shows, it was the bringing together of diverse data and testimonials from anthropology, ecology, geography, soil science, and more by an anthropologist (Schwartzman) and his lawyer colleague (Rich) that made the case convincing and effective for policy change. The approach to environmental anthropology that we advocate entails the incorporation of diverse forms of data-both qualitative and quantitative, social and environmental-whether by the individual researcher or by collaborative teams of scientists from different disciplines.

Our findings indicate that, on average, publications today have substantially less quantitative and environmental data than in earlier decades and that collaboration with scholars from other disciplines who might provide these data has not risen. They also indicate a steep decline in the use of tables and figures, which are effective for communicating research findings to policy makers. Why is this the case, and what can we do about it? Although a separate study is needed to address the why question, we notice that cohort 8 (2002-06) of this study was by far the largest and most diverse book cohort and the largest *Human Organization* cohort. Environmental anthropology has moved (appropriately, we feel) beyond a primary focus on reciprocal human-environment interactions to include such topics as conservation, globalization, and the cultural politics of natural resources, with corresponding analysis of environmental discourses, institutions, projects, and social justice. The expansion of the field raises the question of whether quantitative methods and environmental data "had their time and place" in the environmental anthropology of earlier decades and are pertinent no longer. We do not think so.

Noting that the new environmental anthropology blends theory with political awareness and policy concerns, Conrad Kottak cautions that "the new ecological anthropology must be careful not to remove humans and their specific social and cultural forms from the analytic framework" (1999:23). He adds, "Cultural anthropologists need to remember the primacy of society and culture in their analysis and not be dazzled by ecological data" (Kottak 1999: 33). Our analysis indicates that something more like the reverse has happened. Like Andrew Vayda and Bradley Walters (1999), who feel that political ecology has become politics without ecology, we are concerned that environmental anthropology is becoming anthropology without environment. We call for a better balance that uses a variety of methodological approaches.

Clearly, environmental anthropologists rarely work at as big and complex a scale as Polonoroeste. But the problems of deforestation, displacement, disease, rights violations, and the rest are often found on smaller scales as well. Given environmental anthropology's ongoing engagement with environmental problems at multiple scales, and given the rise in policy focus documented here, we urge environmental anthropologists to bring quantitative and environmental data back into their work, whatever its focus. Doing so, we believe, will make us more effective in contributing both to policy andto the solution of environmental problems.

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NOTE

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FOR FURTHER READING

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APPENDIX A. *Monographs Used in Analysis*

Cohort	Author	Title
1	Rappaport	*Pigs for the Ancestors*
1	Netting	*Hill Farmers of Nigeria*
1	Bennett	*Northern Plainsmen*
1	Johnson	*Sharecroppers of the Sertão*
1	Meggers	*Amazonia*
1	Reichel-Dolmatoff	*Amazonian Cosmos*
2	Waddell	*The Mound Builders*
2	Brightman	*Grateful Prey*
2	Cole and Wolf	*The Hidden Frontier*
2	Collier	*Fields of the Tzotzil*
2	Marks	*Large Mammals and a Brave People*
2	Vayda	*War in Ecological Perspective*
3	Brush	*Mountain, Field, and Family*
3	Orlove	*Alpacas, Sheep, and Men*
3	Ellen	*Nuaulu Settlement and Ecology*
3	Isbell	*To Defend Ourselves*
3	DeWalt	*Modernization in a Mexican Ejido*
3	Durham	*Scarcity and Survival in Central America*
3	Lee	*The !Kung San*
3	Ingold	*Hunters, Pastoralists and Ranchers*
3	Kottak	*The Past in the Present*
3	Netting	*Balancing on an Alp*
4	Alcorn	*Huastec Mayan Ethnobotany*
4	Dove	*Swidden Agriculture in Indonesia*
4	Descola	*In the Society of Nature*
4	Morren	*The Miyanmin*
5	Acheson	*The Lobster Gangs of Maine*
5	Sheridan	*Where the Dove Calls*
5	Viazzo	*Upland Communities*
5	Fratkin	*Surviving Drought and Development*
5	Hunn and Selam	*Nch'i-wàna, "The Big River"*
5	Lansing	*Priests and Programmers*
5	Palsson	*Coastal Economies, Cultural Accounts*
5	Smith	*Inujjuamiut Foraging Strategies*
5	Wenzel	*Animal Rights, Human Rights*
5	Wilk	*Household Ecology*
6	Guillet	*Covering Ground*
6	Little	*The Elusive Granary*
6	Schmink and Wood	*Contested Frontiers in Amazonia*
6	Moran	*Through Amazonian Eyes*
6	Stonich	*I Am Destroying the Land!*
6	Balée	*Footprints of the Forest*
6	Chibnik	*Risky Rivers*
6	Leach	*Rainforest Relations*
6	Peters	*Dividing the Commons*
6	Fairhead and Leach	*Misreading the African Landscape*
6	Stone	*Settlement Ecology*
7	Faust	*Mexican Rural Development and the Plumed Serpent*
7	Jansen	*Political Ecology, Mountain Agriculture, and Knowledge in Honduras*
7	McCay	*Oyster Wars and the Public Trust*
7	Nazarea	*Cultural Memory and Biodiversity*
7	Berkes	*Sacred Ecology*
7	Griffith	*The Estuary's Gift*
7	Krech	*The Ecological Indian*
7	Sivaramakrishnan	*Modern Forests*
7	Fisher	*Rain Forest Exchanges*
7	Godoy	*Indians, Markets, and Rainforests*
8	Alley	*On the Banks of the Ganga*
8	Brockington	*Fortress Conservation*
8	Harper	*Endangered Species*
8	Orlove	*Lines in the Water*
8	Raffles	*In Amazonia*
8	Rival	*Trekking through History*
8	Satterfield	*Anatomy of a Conflict*
8	Sayre	*Ranching, Endangered Species, and Urbanization in the Southwest*
8	Acheson	*Capturing the Commons*
8	Cormier	*Kinship with Monkeys*
8	Hayden	*When Nature Goes Public*
8	Nadasdy	*Hunters and Bureaucrats*
8	Igoe	*Conservation and Globalization*
8	McCabe	*Cattle Bring Us to Our Enemies*
8	Anderson	*Tending the Wild*
8	Cruikshank	*Do Glaciers Listen?*
8	Tsing	*Friction*
8	Gezon	*Global Visions, Local Landscapes*
8	Lansing	*Perfect Order*
8	West	*Conservation Is Our Government Now*